

Microstructure Gradient-Z Composite for Additive Manufacture of Radiation Shielding, Phase I

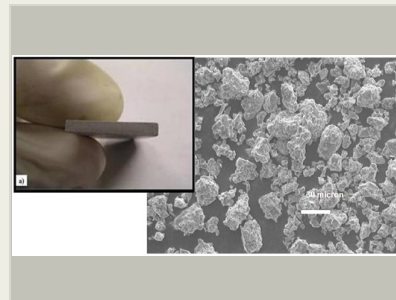
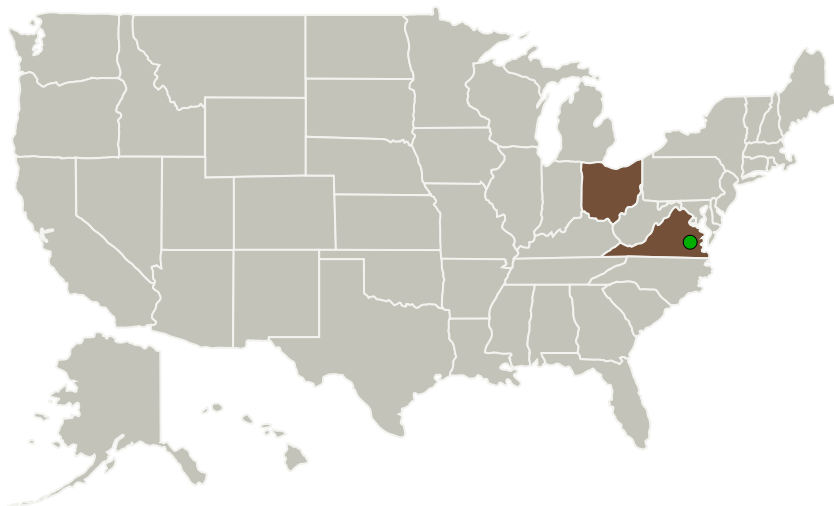
Completed Technology Project (2016 - 2016)



Project Introduction

During space-flight system design, choice in electronic components/devices is an important choice when considering maximum failure tolerance from space radiation effects. A technology that can provide enhanced reliability of flight electronics by significantly reducing exposed radiation damage with minimum shield mass offers improved chances for mission success, and thus reducing system errors, saving program cost and resources. Powdermet proposes the development of a gradient-Z powder additive for plastics that can transform them into effective radiation shields. The elective ease of radiation hardening off-the-shelf electronics with an easily applied shielding encapsulate reduces cost and time to launch. The technical approach will be in the computational validation and experimental verification of a gradient-Z micropowder composite additive for granting radiation shielding to plastics. These will be compared to conventional gradient-Z metal lay-up designs. Additional, the program will demonstrate the additive manufacturing capacity of gradient-Z micropowder composites.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Powdermet, Inc.	Lead Organization	Industry	Euclid, Ohio
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Ohio	Virginia

Project Transitions

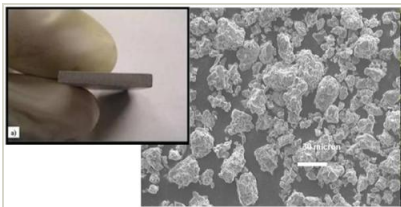
June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139680>)

Images



Briefing Chart Image

Microstructure Gradient-Z Composite for Additive Manufacture of Radiation Shielding, Phase I
(<https://techport.nasa.gov/image/131603>)



Final Summary Chart Image

Microstructure Gradient-Z Composite for Additive Manufacture of Radiation Shielding, Phase I Project Image
(<https://techport.nasa.gov/image/135666>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Powdermet, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

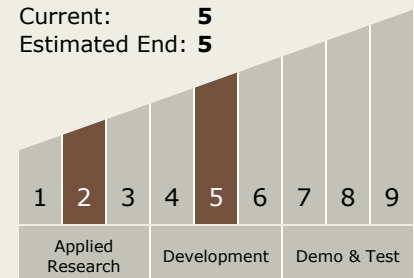
Carlos Torrez

Principal Investigator:

Brian S Werry

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.1 Avionics Component Technologies
 - └ TX02.1.1 Radiation Hardened Extreme Environment Components and Implementations

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System